

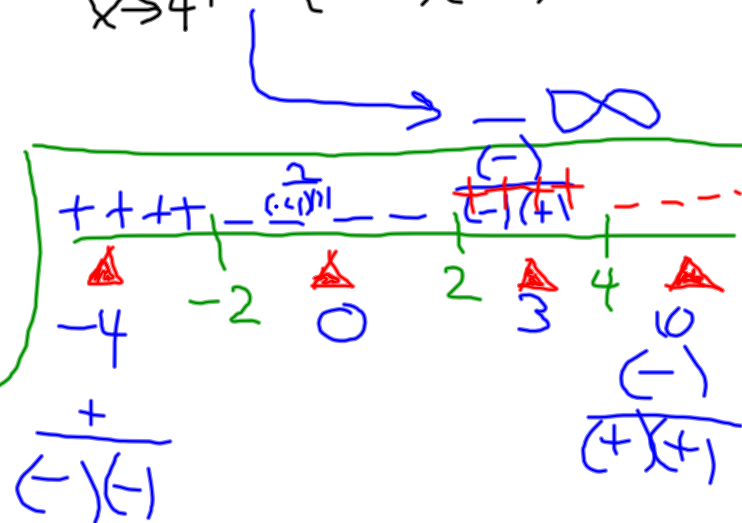
$$\lim_{x \rightarrow 4^-} \frac{2-x}{(x-4)(x+2)} \quad \begin{matrix} (-) \\ (-)(+) \end{matrix}$$

$$= \frac{2-(4)}{(4-4)(4+2)} = \frac{-2}{(0)(6)} \quad \begin{matrix} \text{DNE} \\ +\infty \\ -\infty \end{matrix}$$

x	(x-4)
3	-1
3.9	-.1
3.99	-.02
⋮	⋮

→ DNE  
+∞

$$\lim_{x \rightarrow 4^+} \frac{(2-x)}{(x-4)(x+2)} \quad \begin{matrix} (-) \\ (+)(+) \end{matrix}$$



$$\lim_{x \rightarrow -4} \frac{2x + 8}{x^2 + x - 12}$$

$$= \frac{2(-4) + 8}{(-4)^2 + (-4) - 12} = \frac{0}{16 - 4 - 12 = 0}$$

$\frac{0}{0} = \text{IDK}$

$$= \lim_{x \rightarrow -4} \frac{2(x+4)}{(x+4)(x-3)}$$

$$= \lim_{x \rightarrow -4} \frac{2}{x-3} = \frac{2}{-4-3} = -\frac{2}{7}$$

$$\lim_{x \rightarrow 0} \frac{x}{\sqrt{x+1} - 1} = \frac{0}{\sqrt{1}-1} = \frac{0}{0} \text{ (he says in a frustrated manner)}$$

IDK

$$= \lim_{x \rightarrow 0} \left( \frac{x}{\sqrt{x+1} - 1} \right) \left( \frac{\sqrt{x+1} + 1}{\sqrt{x+1} + 1} \right)$$

$$(a-b)(a+b) = a^2 - b^2$$

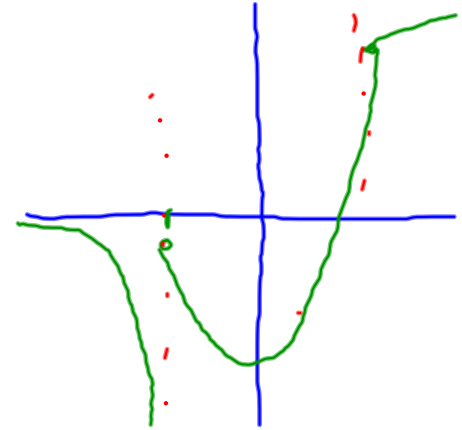
$$= \lim_{x \rightarrow 0} \frac{(x)(\sqrt{x+1} + 1)}{(x+1) - 1}$$

$$\overset{49}{(50-1)} \overset{51}{(50+1)} = 50^2 - 1^2 = 2500 - 1$$

$$= \lim_{x \rightarrow 0} \frac{\cancel{x}(\sqrt{x+1} + 1)}{\cancel{x}} = 1+1=2$$

$$f(x) = \begin{cases} \frac{1}{x+2} & ; x < -2 \\ x^2 - 5 & ; -2 < x \leq 3 \\ \sqrt{x+13} & ; x > 3 \end{cases}$$

Annotations:   
 - For  $\frac{1}{x+2}$ :  $x \rightarrow -2^-$  (blue arrow), DNE,  $+\infty$ ,  $-\infty$  (red arrows).   
 - For  $x^2 - 5$ : circled in red,  $x \rightarrow -1$  (red arrow).   
 - For  $\sqrt{x+13}$ :  $x \rightarrow \infty$  (red arrow).



$$\lim_{x \rightarrow -2} f(x)$$

DNE

$$\lim_{x \rightarrow -2^-} f(x) = -\infty$$

$$\lim_{x \rightarrow 0} f(x)$$

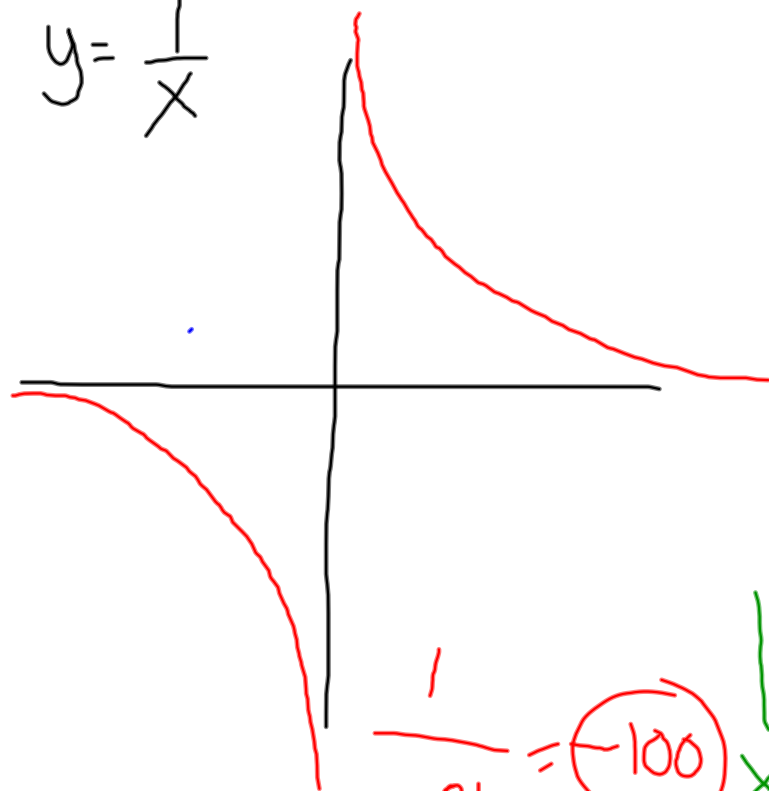
$$= 0^2 - 5 = -5$$

$$\lim_{x \rightarrow 3} f(x)$$

$$= 3^2 - 5 = 4$$

$$= \sqrt{3+13} = 4$$

$$y = \frac{1}{x}$$



$$\lim_{x \rightarrow 0} \frac{1}{x} = ?$$

$\left[ \begin{array}{l} \text{DNE} \\ +\infty \\ -\infty \end{array} \right]$

$$\lim_{x \rightarrow 0^+} \frac{1}{x} = +\infty$$

$$\lim_{x \rightarrow 0^-} \frac{1}{x} = -\infty$$

$$\frac{1}{-.01} = -100$$

$x$	$\frac{1}{x}$
1	1
.1	10
.001	1000
-.000001	very big